

Geocomp Corporation  
Supplemental Analysis  
And  
Comment Response

8 May 2007  
Jon No. 20113

Sitec Environmental Inc.  
769 Plain Street Suit Unit C  
Marshfield, MA 02050

Attention: Mr. Mike Quatromoni

Subject: MSE Perimeter Berm  
Crow Lane Landfill Corrective Action  
Design - Newburyport, Massachusetts

Gentlemen;

As requested, we have reviewed the MDEP review comments regarding the MSE perimeter berm for the Crow Lane Landfill contained in their letter of 03/07/07. This letter provides updated analyses and design details that address their comments.

## **INTRODUCTION**

The analyses and design recommendations described hereinafter have been based on the following assumptions:

- 1) Stability analyses have assumed site foundation conditions and engineering properties previously developed by GZA Geoenvironmental. This includes a friction angle of 35 degrees for the natural inorganic foundation soils.
- 2) Sitec Environmental, Inc, based on its knowledge, has indicated that a surficial deposit of soft organic soils, that was known to exist beneath the footprint of a portion of the existing perimeter berm, was removed and replaced with controlled fill. This knowledge is based on photographic documentation provided by NewVentures as well as testimony from NewVentures management personnel that were present during the work. Our stability analyses have, therefore, assumed that these soft soils are not present. However, unless construction documentation can be provided to verify that, in fact, the organic soils have been removed, we recommend that additional investigation be performed to confirm that the organic soils are not present. If organic soils were to exist, our stability analyses would not be valid, and the proposed MSE berm design would have to be revised.
- 3) The completion of the perimeter berm, including the MSE components, will be observed in the field on a full-time basis by Geocomp Corporation.

## **RESPONSE TO MDEP COMMENTS**

The following item numbering correspond to item numbering in the MDEP letter.

### 1. Berm Foundation

Geocomp Corporation does not have any information on the existing foundation soils, other than the GZA slope stability analysis and photographs provided by Sitec Environmental.

### 2. Existing Berm Construction

- a. On 3 April, 2006 Mr. Dick Stulgis (GEOCOMP Corporation) visited the site and observed conditions in 18 machine-excavated test pits that had been performed through the top of the berm around the perimeter of the landfill by New Venture Associates. The test pits ranged from several feet to in excess of 8 ft. deep. Generally, processed asphalt, brick and concrete materials, with varying amount of fines, was observed in the test pits (see attached Photographs). Samples were collected and delivered to GEOCOMP Corporation. The sampler collected the soil-size fractions of materials without the larger pieces.

Geotesting Express Inc. performed 11 gradation tests on				
Sample Name	% Cobble	%Gravel	%Sand	%Silt & Clay Size
P2-3	-	50	37	13
P2-6	-	37	48	15
P2-9	-	69	24	8
P1-3	7	49	34	10
P1-6	-	55	35	10
P1-9	-	51	40	9
P16-3	0.3	95	4	1
P16-6	-	45	49	6
P16-9	-	51	36	14
P16-12	17	36	35	12
P16-15	-	48	38	14

With the exception of sample P 16-3, which is 95% gravel, the samples appeared consistent and typically comprised of a brown silty gravel with sand, AASHTO Classification A-1-a Stone fragments, Gravel and Sand with larger pieces of crushed concrete, bricks and stones.

Geotesting Express Inc also performed a large scale direct shear test on a composite sample made from representative samples P1-9 and P1-6. The data sheet for the test is attached. The results of this test indicate a strength envelope represented by a friction angle of 43 degrees. For design we have assumed a strength of 40 degrees for the berm material. Additional strength testing will be required during construction, to confirm that the berm is constructed with materials that meet or exceed the design strength assumption.

- b. Geocomp Corporation does not have any information regarding the QA/QC testing and construction procedures for the existing portions of the perimeter berm.

- c. The perimeter berm design has been modified to include surface erosion and stability protection, consisting of a 2.75 foot thickness of 3" stone rip-rap. The attached slope stability analysis results demonstrate that the minimum factor of safety for shallow slope failures on the 1.5H: 1V slopes has been increased to 1.5
- d. The 1H: 1V slope on the northerly berm has been eliminated and replaced with a maximum slope of 1.5H: 1V. This slope will be protected with a 2.75 foot thickness of 3" stone rip-rap. The toe of the slope includes sections of rock buttress. The factor of safety of these slopes is greater than 1.3.

### 3. MSE Berm Design

- a. We have modified the gradation specification based on materials that were collected from the existing berm. The percent passing the No. 200 sieve shall be no more than 15%. The specified strength shall be confirmed by additional testing during construction.
- b. The Clean Structural Fill and the reinforced fill are the same materials. The construction documents should be updated to ensure all materials are specified.
- c. c. d. and e. We have performed additional analyses (results attached) that include:
  - 1. Added 7 feet of rip-rip at the base of the slope.
  - 2. Incorporated the steeply sloped geosynthetic cap materials, and heavier fill material behind the MSE berm.
  - 3. Increased reinforcement lengths to achieve a minimum factor of safety of greater than 2.0 against internal stability.
  - 4. Analyzed additional failure surfaces through the berm subgrade and sliding on the cap materials. The minimum Factor of Safety for Global stability is 1.37.
  - 5. Analyzed bearing capacity of the MSE berm (Computations are attached).
- f. We are providing a drawing with MSE berm face details. A secondary geogrid reinforcement face wrap is not part of the design.
- g. The attached Table shows the revised geogrid reinforcement. These details should match the construction drawings.
- h. We have revised the test designation for tensile strength of the geogrid to be ASTM D6637 and the test method for junction strength of the geogrid to be GRI GG-2. See attached MSE Specifications.

### 4. CQA Plan

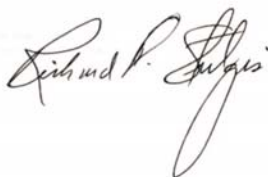
- a. Our design requires that the completion of the perimeter berm, including the MSE components, will be observed in the field on a full-time basis by Geocomp Corporation. The specifications include testing for the CQA plan.
- b. GEOCOMP Corporation will provide the Certification Report for the berm components upon

completion of the perimeter berm.

Sincerely yours,  
GEOCOMP CORPORATION



Martin Hawkes, P.E.  
Project Manager



Richard P. Stulgis, P.E.  
Senior Consultant

Attachments:

Test Pit Photographs  
Updated results of MSE Berm Stability Analyses  
Bearing capacity computations  
Updated MSE Berm Specifications  
Wall facing details  
Slope protection details.  
Rock wall details.

# Crow Lane Landfill

Test pit pictures 04/03/06























